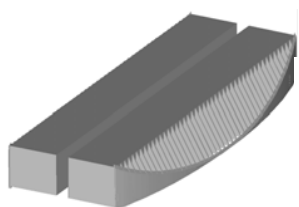


LED LIGHTING: PROMISING BUT CHALLENGING

Task lights, commonly used in offices, homes, and dormitories, often use incandescent lamps because they are inexpensive and offer good optical properties. However, incandescents have high energy use and are often hot to the touch. Compact fluorescent lamps (CFLs) are sometimes used, but they are bulky, requiring large fixtures and posing difficulties in focusing the light.

Light-emitting diode (LED) lighting, a fairly new solid-state source, shows promise because of its small size and energy efficiency potential. However, as an emerging technology, LEDs have not yet been widely used for general lighting purposes.

Because of their potential benefits, LEDs are a viable consideration for task lighting. Researchers from Lawrence Berkeley National Laboratory (LBNL) developed a high-performance prototype LED task light using state-of-the-art technology. The 11.5-watt unit uses two rows of 1-watt LEDs to provide lighting coverage equivalent to that of a 40-watt incandescent or 18-watt CFL task lamp.



*Cooling fins
enhance LED
operation.*

LED TASK LIGHT USING NEW MATERIALS TO IMPROVE PERFORMANCE

LBNL RESEARCHERS DEVELOPED AN LED TASK LIGHT USING HIGH BRIGHTNESS LEDs, AN ADVANCED OPTICAL DESIGN, AND NEW MATERIALS TO REDUCE THERMAL STRESS. THE ADVANCED OPTICS ALLOW THE LED SYSTEM TO USE 70 PERCENT LESS ENERGY THAN A COMPARABLE INCANDESCENT UNIT, EVEN THOUGH THE TWO LIGHT SOURCES HAVE SIMILAR ENERGY EFFICIENCY.

IN ADDITION, THE FIXTURE USES A CONSUMER-FRIENDLY DESIGN TO SPEED MARKET ACCEPTANCE.



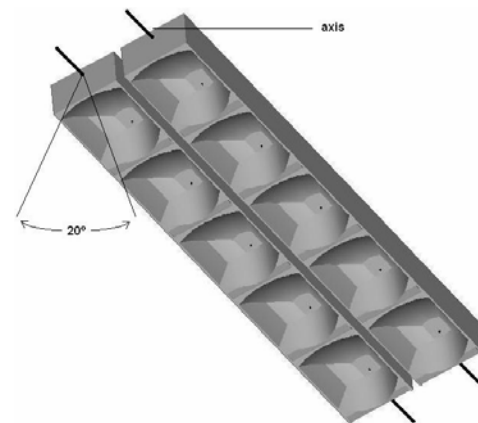
Prototype LED task light

LBNL's project team included four manufacturers:

- Permlight for thermal management
- Advanced Transformer for the ballast with variable intensity
- Cree Lighting for the LEDs
- Luxo for the luminaire

LED MATCHES CFL PERFORMANCE WHILE CUTTING ENERGY USE

The prototype LED task light promises to provide high-quality lighting while cutting energy use, all in a sleek luminaire.



Three-dimensional simulation of the lamp reflector looking up into the reflector cups

Benefits

- Cuts energy use by 70 percent compared to incandescent lamps and 40 percent compared to CFL task lights
- 50,000 hour LED life expected, far exceeding 750 hours for incandescent and 10,000 for fluorescent
- Specialized optics provide proper light distribution on the workplane
- New assembly board and unique cooling fin design improves thermal management, giving long LED life and high light output

INTERESTED?

LED task lights are ideally suited for office buildings, single- and multi-family dwellings, dormitories, and, hotels. Building managers and owners, along with individuals, may all benefit from LED task lighting.

Key next steps include:

- Develop a next-generation prototype with lighting colors appropriate for a range of applications.
- Demonstrate the LED task light in various applications.
- Develop a commercial product.
- Educate building owners, home owners/renters, university dorm officials, and utilities about product availability and benefits.
- Work with retail outlets to stock the units after they are commercially available.

Luxo Corporation intends to market a new product, the Esol task light, based on this prototype. For information, contact Luxo (www.luxous.com).

This project was part of the PIER Lighting Research Program. To view the project results, as well as other current research activities, visit www.energy.ca.gov/pier.

Additional information about this technology can be found on the following web sites:

- PIER contractor site:
www.archenergy.com/lrp/advlight_tech/project_2_2.htm
- PIER researcher site:
http://lighting.lbl.gov/l_sources.html



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Contact Information

California Energy Commission
www.energy.ca.gov/pier
Michael Seaman
mseaman@energy.state.ca.us

Architectural Energy Corporation
www.archenergy.com/lrp
Judie Porter
jporter@archenergy.com

Lawrence Berkeley National Laboratory
www.lbl.gov
Steve Johnson
SGJohnson@lbl.gov



Arnold Schwarzenegger, *Governor*
California Energy Commission
Chair: Jackalyne Pfannenstiel
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LED TASK LIGHT



A NOVEL AND ENERGY
EFFICIENT APPROACH
TO DESK LIGHTING



Public Interest
Energy Research